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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/309,768	05/11/1999	HIROFUMI SHIMOMURA	134960/98	7947

21254 7590 04/24/2002

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EXAMINER

SEDIGHIAN, REZA

ART UNIT

PAPER NUMBER

2633

DATE MAILED: 04/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/309,768

Applicant(s)

SHIMOMURA ET AL.

Examiner

M. R. Sedighian

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 May 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 12-25 is/are rejected.
- 7) ☒ Claim(s) 7-11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 May 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

1. The Japanese references cited by the IDS form are not considered because there is no English translation provided.

2. The specification is objected because of the following informality:

a) The reference numeral "31", in line 19 of page 14, should change to --- 33 ---.

Correction is required.

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "a second optical filter connected to the output of the second optical amplifier, pumping light generated by wavelength-division multiplexing, pumping light generated by polarization multiplexing, a signal light detector for detecting whether or not a signal light is inputted to the first optical amplifier, a second control circuit for providing the first and second optical amplifiers with control signals for shutting down the first and second optical amplifiers, an optical network in which a plurality of optical nodes are connected through an optical fiber transmission lines, and wherein each of the plurality of optical nodes comprises an optical switch " must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 18-19, 21-23 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims 18-19, it is not clear how the first and second optical amplifiers are pumped by a light signal that is generated by wavelength-division multiplexing, or by polarization multiplexing. Specification only discloses (P. 12, lines 7-10) light outputted from a plurality of pumping sources may be wavelength-division multiplexed or polarization multiplexed. It is not clear how the light outputted from the pumping source wavelength-division multiplexed or polarization multiplexed.

As to claim 21-22, it is not clear what is meant by "... at least one second optical amplifier whose input is connected to the output of said at least one first optical wavelength multiplexer; ...", and "a second optical wavelength multiplexer whose input is connected to the output of said at least one second optical amplifier". Figure 14 shows gate optical amplifiers 161-164 that each has a first and a second optical amplifier that are controlled by a control circuit, and an EDF 14 (which can be considered as a third amplifier) with an input connected to the output of first optical multiplexer 304, and an output that is connected to the second optical multiplexer 305. It is not clear which amplifier is the second amplifier, which has an input that is connected to the output of the first optical wavelength multiplexer??

As to claim 23, it is not clear what is meant by "a second control circuit for providing said first and second optical amplifiers with control signals for shutting down said first and second optical amplifiers ...". Specification discloses (P. 18, lines 27-29) the optical monitor 41

monitors whether the signal light is present or absent, and if OLOS is detected the output of lights from the pumping sources 31 and 32 is shut down (P. 19, lines 16-18). Figure 15 shows only a first controller 300 that can shut down pumps 31 and 32 based on a signal from the monitor circuit 41. Which controller is the second controller??

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 5-6, 16, 18, 23, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugaya (US patent No: 5,812,710).

Regarding claim 1, Sugaya discloses an optical switch (fig. 23) comprising: a first optical amplifier (122, fig. 23); a second optical amplifier (123, fig. 23); and a first control circuit (127, fig. 23) for outputting first and second control signals (col. 18, lines 37-41) for switching a gain of the first and second amplifiers (col. 18, lines 10-36).

Regarding claim 2, Sugaya further discloses semiconductor optical amplifier (col. 20, lines 5-27).

Regarding claim 3, Sugaya further discloses optical fiber amplifier (col. 18, lines 16-27).

Regarding claim 5, Sugaya further discloses a first optical coupler (col. 7, lines 25-28 and 30, fig. 23), and a second optical coupler (30, fig. 23) inserted between the first (122, fig. 23) and second (123, fig. 23) optical amplifier.

Regarding claim 6, Sugaya further discloses an optical power monitor (col. 16, lines 32-41 and 112, 113, fig. 23).

Regarding claim 16, Sugaya further discloses a forward-pumped optical fiber amplifier (col. 7, lines 9-28).

Regarding claim 18, as it is understood, Sugaya further discloses the pumping light generated by wavelength-division multiplexing (col. 16, lines 32-58, 64-67, col. 17, lines 1-45 and 114, figs. 20, 22 and 127, fig. 23).

Regarding claims 23, as it is understood, Sugaya further discloses a signal light detector (111, 112, 113, fig. 23), for detecting if the signal light is inputted to the first amplifier (col. 16, lines 32-50), and a control circuit (127, fig. 23) for shutting down the first and second amplifiers (col. 18, lines 37-41).

Regarding claim 25, as it is understood, Sugaya further discloses a plurality of nodes that are connected through an optical fiber line and having optical line amplifiers (col. 1, lines 35-41).

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya (US patent No: 5,812,710) in view of Luo et al. (US Patent No: 6,008,932).

Regarding claims 4 and 12, Sugaya differs from the claimed invention in that Sugaya does not disclose the optical amplifying unit further includes a first, a second, and a third

isolator. Luo discloses an optical amplifying section (202, fig. 2) that is comprised of a plurality of optical isolators (210, 218, 226, fig. 2), and a multi-stage EDF amplifiers (212, 224, fig. 2).

Therefore, it would have been obvious to an artisan at the time of invention to incorporate optical isolators that are connected to optical amplifiers such as the ones of Luo for the optical amplifying unit of Sugaya in order to block the backward scattering of light. Furthermore connecting optical fiber isolators between multiple fiber amplifiers is conventionally known.

Regarding claim 15, Sugaya discloses the first optical amplifier (122, fig. 23) comprises of an erbium-doped optical fiber (col. 18, lines 22-35), and a pumping source (125, fig. 23). Sugaya differs from the claimed invention in that Sugaya does not specifically disclose the pumping source generates a light of 980 nm wavelength. Luo further discloses a pumping source that generates a light of 980 nm wavelength for pumping the doped fiber (col. 4, lines 9-12). Therefore, it would have been obvious to a person of ordinary skill in the at the time of invention to incorporate a pump source of 980 nm wavelength such as the one of Luo for the pump source in the optical amplifying unit of Sugaya in order to provide a better gain behavior and a low noise figure for signals in the low band region to improve the transmission quality and to further provide compatibility with existing amplifier components technology.

10. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya (US patent No: 5,812,710) in view of Terahara (US Patent No: 6,097,535).

Regarding claims 13-14, Sugaya differs from the claimed invention in that Sugaya does not disclose a first and second filter. Terahara discloses optical amplifiers (32, fig. 6) and optical filters (36, 38, fig. 6) between the optical amplifier (col. 4, lines 21-32). Therefore, it would have

been obvious to an artisan at the time of invention to incorporate optical filters that are connected to optical amplifiers such as the ones of Terahara for the optical amplifiers in the optical amplifying unit of Sugaya in order to cancel the wavelength dependence of gain and to reduce deviation in signal-to-noise ratio, and deviation in signal power of the signal light with respect to wavelength.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya (US patent No: 5,812,710) in view of Tsuda et al. (US Patent No: 6,038,063).

Regarding claim 17, Sugaya differs from the claimed invention in that Sugaya does not disclose one of the optical amplifiers comprises a bidirectional-pumped optical fiber amplifier. Tsuda discloses a bidirectional-pumped optical fiber amplifier (col. 5, lines 11-21 and 44, 48, 48', fig. 3). Therefore, it would have been obvious to a person of ordinary skill in the at the time of invention to incorporate a bidirectionally pumped optical fiber amplifier such as the one of Tsuda for one the optical amplifiers in the optical amplifying unit of Sugaya in order to further increase the output power of the signal light and to improve the signal to noise ratio.

12. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugaya (US patent No: 5,812,710) in view of Kinoshita (US Patent No: 6,342,965).

Regarding claim 19, as it is understood, Sugaya differs from the claimed invention in that Sugaya does not disclose one of the optical amplifier has a pump light that is generated by a polarization multiplexing. Kinoshita discloses an optical amplifier (51, fig. 5 and 61, fig. 6) that has a pump light (53-1, fig. 5 and 63, fig. 6) which is generated by a polarization multiplexing



(col. 20, lines 59-67, col. 21, lines 47-50). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate an optical amplifier and a pump light generated by a polarization multiplexing such as the one of Kinoshita for one of the optical amplifiers in the optical amplifying unit of Sugaya in order to increase the pump power launched into the fiber and to further reduce instability of gain due to polarization dependency.

13. Claims 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glance (US patent No: 5,764,821) in view of Sugaya (US patent No: 5,812,710).

Regarding claim 20, Glance discloses an optical switch (col. 2, lines 20-45 and 50, fig. 1) for a wavelength-division multiplexed light (col. 2, lines 48-55 and  $F_1F_2F_N$ , fig. 1) that is comprised of an optical demultiplexer (33, fig. 1), a plurality of single wavelength optical switches (col. 2, lines 57-67 and 50, fig. 1), and an optical multiplexer (35, fig. 1). Glance differs from the claimed invention in that Glance does not disclose the optical switch comprises of a first and second optical amplifiers and a control circuit. Sugaya discloses an optical amplifying unit (120, fig. 23) that includes a first (121, fig. 23) and a second optical amplifier (122, fig. 23), a first and a second optical coupler (30, fig. 23), and a control circuit (127, fig. 23) for outputting first and second control signals to switch a gain of the first and second amplifiers (col. 18, lines 16-41). Therefore, it would have been obvious to an artisan at the time of invention to incorporate an optical amplifying unit such as the one of Sugaya for the optical amplifiers in the optical transmission network of Glance in order to increase the pump power launched into the fiber for increasing the signal light output power to further increase the transmission distance.

Regarding claim 24, Glance further discloses a plurality of nodes (col. 2, lines 20-34 and 30, fig. 1) that are connected through an optical fiber line (20, fig. 1), and wherein each of the nodes comprises an optical switch (50, fig. 1), as discussed above.

14. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosaka (US patent No: 6,094,296).

Regarding claims 21-22, as it is understood, Kosaka discloses an optical switch (col. 3, lines 61-64 and 11, 14, 22, fig. 4) for a wavelength-division multiplexed light ( $\lambda_1$ ,  $\lambda_2$ ,  $\lambda_3$ , fig. 4), comprising: an optical wavelength demultiplexer (18, 20, fig. 4) for demultiplexing the light into a plurality of branches ( $\lambda_1$ ,  $\lambda_2$ ,  $\lambda_3$ , fig. 4), a plurality of first optical amplifiers (21b, 21c, fig. 4), a plurality of optical couplers connected to the outputs of the first optical amplifiers (23b, 23c, fig. 4), an optical wavelength multiplexer (19, fig. 4), a second optical amplifier (10, fig. 4), and a control circuit (14, fig. 4) for outputting first and second control signals for switching a gain of the first and second optical amplifiers (col. 6, lines 11-27). Kosaka differs from the claimed invention in that Kosaka does not disclose a plurality of first optical couplers connected to each of the plurality of branches. Kosaka discloses optical filters (20a, 20b, 20c, fig. 4) that are connected to each respective optical line amplifying units (17a, 17b, 17c, fig. 4), and therefore, optical couplers can be provided to couple the filters to the amplifying units. Furthermore, Kosaka discloses optical couplers (33, 35, fig. 10) that are used to branch (col. 13, lines 7-16) part of the input and output signals for further monitoring (34, 36, fig. 10) and control (14, fig. 10). Therefore, it would have been to a person of ordinary skill in the art at the time of invention to incorporate a plurality of optical couplers for the respective branch lines in the optical


demultiplexing and amplification units of Kosaka in order to partially split a portion of the input light signal for further signal processing and signal monitoring.

15. Claims 7-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

  
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